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SPECIAL SPECIFICATION

SECTION 08800S

GLASS AND GLAZING

STANDARD SPECIFICATION

SECTION 08800

GLASS AND GLAZING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Definitions: "Glass" includes prime glass, processed glass and fabricated glass products. "Glazing" includes glass installation and materials used to install glass.

B. Extent of glass and glazing work is indicated on drawings and schedules.

C. Types of work in this section include glass and glazing for:

1. Window units, not indicated as "preglazed"
2. Storefront construction
3. Entrances and other doors, not indicated as "preglazed"
4. Frameless mirrors

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)

C509 Specification for Cellular Elastomeric Preformed Gasket and Sealing Material

C542 Specification for Lock-Strip Gaskets

C716 Specification for Installing Lock-Strip Gaskets and Infill Glazing Materials

C719 Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)

C794 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants

C864 Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

C920 Specification for Elastomeric Joint Sealants

C1036 Specification for Flat Glass

C1048 Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass

E163 Methods of Fire Tests of Window Assemblies

E774 Specification for Sealed Insulating Glass Units

B. American Architectural Manufacturers Asso. (AAMA)

800 Voluntary Specifications and Test Methods for Sealants

C. American National Standards Institute (ANSI)

Z97.1 Safety Performance and Methods of Test for Safety Glazing Material Used in Buildings

D. Associated Laboratories, Inc. (ALI)

E. Code of Federal Regulations (CFR)

16 CFR Part 1201 Safety Standard for Architectural Glazing Materials

F. Insulating Glass Certification Council (IGCC)

G. National Fire Protection Assoc. (NFPA)

80 Standard for Fire Doors and Windows

H. Safety Glazing Certification Council (SGCC)

I7. Underwriters Laboratories, Inc. (UL)

9 Fire Tests of Window Assemblies

1.03 SYSTEM DESCRIPTION

Glass And Glazing: Provide glass and glazing that has been produced, fabricated and installed to withstand normal thermal movement, wind loading and impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects in the work.

A. Normal thermal movement is defined as that resulting from an ambient temperature range of 120 degrees F (67 degrees C) and from a consequent temperature range within glass and glass framing members of 180 degrees F (100 degrees C).

B. Deterioration of laminated glass is defined as the development of manufacturing defects including edge separation or delamination which materially obstructs vision through glass.

1.04 PERFORMANCE REQUIREMENTS:

A. Blast Requirements: Provide a window assembly that is designed to withstand a pressure of 1 psi, based on a 250 lb. Charge of TNT at a 100' stand-off distance.

B. Sound Attenuation Through Wall Assembly (Exterior To Interior): Provide a minimum STC-45 measured in accordance with AAMA TIR-A1 and/or ASTM E413.

1.05 SUBMITTALS

The following shall be submitted in accordance with Division 1, Section " Descriptive Submittals":

A. Environmental Ojectives Documentation: Signed by the manufacturers/fabricators stating level of compliance for the requirements and objectives of Section 01805S – Environmental Objectives.

B. Product Data: Submit manufacturer's catalog data for each glazing material and fabricated glass product required, including installation and maintenance instructions. Submit product literature showing manufacturer's standard patterns available for patterned glass for selection by the Sandia Delegated Representative (SDR).

C. Drawings: Complete detailed drawings showing the proposed setting methods and materials shall be submitted for approval.

D. Material Safety Data Sheets (MSDS): Submit MSDS for glazing materials, including sealant, tape, and gasket.

E. Certificates of Compliance: Provide certificates of compliance attesting that the glass meets the requirements specified, to include manufacturer's labels designating type and thickness of glass.

F. Compatibility and Adhesion Test Report: Submit statement from sealant manufacturer indicating that glass and glazing materials have been tested for compatibility and adhesion with glazing sealants, including interpretation of test results relative to material performance with recommendations for primers and substrate preparation needed to obtain adhesion.

1.05 QUALITY ASSURANCE

A. Primary Glass Standard: Provide primary glass which complies with ASTM C1036 requirements, (unless otherwise specified) including those indicated by reference to type, class, quality, and, if applicable, form, finish, mesh and pattern.

B. Glazing Standards: Comply with recommendations of FGMA "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

C. Safety Glazing Standard: Where safety glass is indicated or required, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.

Provide safety glass permanently marked with certification label of SGCC or other certification agency acceptable to the SDR.

D. Heat-Treated Glass Standard: Provide heat-treated glass which complies with ASTM C1048 requirements, including those indicated by reference to kind, condition, type, quality, class and, if applicable, form, finish, and pattern.

E. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C920 requirements, including those for type, grade, class and uses.

F. Fire-Resistant Rated Wire Glass: Provide wire glass products that are identical to those tested per ASTM E163 (UL 9) and are labeled and listed by UL or other testing and inspecting agency.

G. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate certificate label of inspecting and testing organizations indicated below:

1. IGCC

2. ALI

H. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

I. Installer (Glazier): Firm with not less than 5 years experience in glazing work similar to required work.

J. All materials used shall not contain asbestos fibers.

1.06 DELIVERY, STORAGE, AND HANDLING

Protect glass and glazing materials during delivery, storage and handling. Comply with manufacturer's instructions to prevent edge damage to glass, damage to glass and glazing materials from effects of moisture including condensation, temperature changes, direct exposure to sun, and from other causes.

Where insulating glass units will be exposed to substantial altitude changes, avoid hermetic seal ruptures by complying with insulating glass fabricator's recommendations for venting and sealing.

1.07 PROJECT CONDITIONS

Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

1.08 WARRANTY

A. Special Warranty Insulating Glass: Manufacturer's special written project warranty shall be provided, agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those insulating glass units developing manufacturing defects. Manufacturing defects are defined as failure of hermetic seal or loss of dehydration (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, and other visual indications of seal failure or performance, provided the manufacturer's published instructions for handling, installing, protecting and maintaining units have been complied with during the warranty period. Include labor replacement costs in warranty.

Warranty Period: Manufacturer's standard but not less than 10 years after date of substantial completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

AFG Industries, Inc.
Falconer Glass Industries
Ford Glass Division
Guardian Industries Corp.
LOF Glass,Inc.
PPG Industries, Inc.
Viracon, Inc.
Vision

2.02 GLASS PRODUCTS-GENERAL

Sizes: Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated.

2.0*3* HEAT-TREATED GLASS PRODUCTS

A. Manufacturing Process: Manufacture heat-treated glass by vertical (tong-held) or horizontal (roller hearth) process, at manufacturer's option, except provide horizontal process where indicated as "tongless" or "free of tong marks."

B. Uncoated Clear Heat-Treated Float Glass: Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), kind as indicated:

1. Kind HS (heat strengthened) where indicated.

2. Kind FT (fully tempered) where indicated.

C. Tempered Glass: Kind FT (fully tempered), Condition A (uncoated surfaces), Class 1 (clear), Quality q8 (glazing), *¼ " (6.4 mm) thick unless otherwise noted.*

1. Patterned Glass: Product: "VP2 8.0.37" by Vision Glass

2. Fire – Resistant Rated Wired Glass: Type II (patterned and wired glass, flat), Class 1 (translucent), Quality q8 (glazing); complying with ANSI Z97.1; 1/4 inch (6.4 mm) thick; of form and mesh pattern indicated below. Glass for fire-rated doors shall comply with NFPA 80.

Form 1: Polished both sides, Mesh m1 (diamond).

2.0*4* LAMINATED GLASS

A. General: Refer to primary and heat-treated glass requirements relating to properties of uncoated glass making up laminated glass products.

B. Plastic Interlayer: Provide glass fabricator's standard polyvinyl butyl interlayer for laminating panes of glass, with a proven record of showing no tendency to bubble, discolor or lose physical or mechanical properties after laminating and installation, in clear or colors and of thickness indicated.

C. Laminating Process: Fabricate laminated glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substances and air/glass pockets.

D. Laminated Safety Glass: Two panes of glass of equal thickness, laminated together with not less than 0.060 inch (1.5 mm) thick plastic interlayer and complying with requirements indicated below.

1. Glass characteristics shall be float glass, complying with requirements for class, tint, kind and thickness of each pane (ply) indicated below.

a. Class 1: Clear for both panes.

b. Kind HS (Heat Strengthened): Refer to schedule at end of section.

c. Reference Section 1.04 – Performing requirements and Section 3.07 schedule.

2. Color of Plastic Interlayer: Clear.

2.05 SEALED INSULATING GLASS UNITS

A. General: Provide preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E774 for performance classification indicated, as well as with other requirements specified for glass characteristics, air space, sealing system, sealant, spacer material, corner design and desiccant.

B. For properties of individual glass panes of made-up units, refer to product requirements specified elsewhere in this section applicable to types, classes, kinds and conditions of glass products indicated.

C. Provide heat-treated panes of kind and at locations indicated and tempered where indicated or where safety glass is designated or required.

D. Performance Classification: ASTM E774-Class A.

1. Product: Provide an approved unit equal to or better than the basis of design: "VE-52" manufactured by Viracon.

   a. Visible Light Transmittance: 40% min. and 50% max.

   b. Relative Heat Gain: >2 or better

   c. U-Value: .34 or better

   d. Shading Coefficient: .33 or better

   e. Exterior/Interior Panes: Refer to Section 1.04 – Performance Requirements and Section 3.07 Schedule.

2. Air Space Thickness: 1/2 inch (13 mm).

3. Sealing System: Manufacturer's standard.

4. Spacer Material: Manufacturer's standard metal.

5. Desiccant: Manufacturer's standard; either molecular sieve or silica gel or blend of both.

6. Corner Construction: Manufacturer's standard corner construction.

2.06 ELASTOMERIC GLAZING SEALANTS AND PREFORMED GLAZING TAPES

A. General: Provide products of type indicated and complying with the following requirements.

1. Compatibility: Select glazing sealants and tapes of proven compatibility with other materials with which they will come into contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experiences.

2. Suitability: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants and tapes which have performance characteristics suitable for applications indicated and conditions at time of installation.

3. Colors: Provide color of exposed sealants as selected by the SDR from manufacturer's standard colors.

B. Sealant Classification: Any sealant qualifying under this specification shall be classified per ASTM C920 (except where otherwise noted) as to type, grade, class, and use as follows:

1. Type S - single component sealant.

2. Grade NS - nonsag or gunnable sealant that permits application in joints on vertical surfaces without sagging or slumping when applied at temperatures between 40 and 122 deg F (4.4 and 50 deg C).

3. Use NT - sealant designed for use in joints in nontraffic areas.

4. Use G - sealant that meets the requirements of ASTM C920 when tested on glass specimens in accordance with ASTM C719, C794 and C794 again after ultraviolet exposure through glass.

5. Use O - sealant that meets the requirements of ASTM C920 when tested on substrates other than the standard substrates in accordance with ASTM C719 and C794.

6. Use A - sealant that meets the requirements of ASTM C920 when tested on aluminum specimens in accordance with ASTM C719 and C794.

C. One-Part Acid-Curing Silicone Glazing Sealant: Type S; Grade NS; Class 25; uses NT, G, A, and, as applicable to uses indicated, O, nonporous hard surface.

2.07 GLAZING GASKETS

A. Lock-Strip Gaskets: Neoprene extrusions of size and shape indicated, fabricated into frame with molded corner units and zipper lock strips; complying with ASTM C542, black.

B. Dense Elastomeric Compression Seal Gaskets: Molded or extruded gaskets shall be of a neoprene material, complying with ASTM C864, of profile and hardness required to maintain watertight seal.

C. Cellular Elastomeric Preformed Gaskets: Extruded or molded closed cell, integral-skinned neoprene of profile and hardness required to maintain watertight seal; complying with ASTM C509, Type II, black.

2.08 MISCELLANEOUS GLAZING MATERIALS

A. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

B. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, with a shore "A" hardness of 80-90 Durometer.

C. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.

D. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.

E. Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi (34-69 kPa) compression strength for 25 percent deflection.

PART 3 - EXECUTION

3.01 EXAMINATION

Require glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, corners, presence and functioning of weep system, existence of minimum required face or edge clearances, and effective sealing of joinery. Obtain glazier's written report listing conditions detrimental to performance of glazing work; provide copy of report to SDR. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

Clean glazing channels and other framing members to receive glass immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.03 GLAZING - GENERAL

A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

B. Glazing channel dimensions as indicated on details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.

C. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or

other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as recommended by sealant manufacturer.

3.04 GLAZING

A. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6 inches (150 mm) from corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.

B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 inches (130 cm) continuous (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8 inch (3.2 mm) minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

D. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.

E. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.

F. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

G. Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

H. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.

I. Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

J. Lock-strip gasket glazing shall comply with ASTM C716 and gasket manufacturer's printed recommendations. Provide supplementary wet seal and weep system unless otherwise indicated.

3.05 PROTECTION AND CLEANING

A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.

D. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

E. Glass surfaces shall be thoroughly cleaned (not more than four days prior to date scheduled for inspection to establish date of substantial completion) with labels, paint spots, putty, and other defacements removed, and shall be clean at the time the work is accepted.

3.06 SCHEDULE:

A. MicroFab:

1. Exterior Glazing: GL-1 = laminated, insulated, blast protected.
a. Lamination for Blast Required: Use 5/16" on in board lites.

2. Interior Glazing: GL-3 = Tempered.
a. Offices are to be GL-3/Patterned.

B. CUB-1:

1. Interior Glazing: GL-3/wired

C. MicroLab:

1. Exterior Glazing: GL-1 and GL-2, where noted on drawings.
a. Lamination for Blast Required: Use 5/16" on in board lites.
b. GL-2 = Spandrel: Sand blasted.

2. Interior Glazing: GL-3

D. WIF:

1. Exterior Glazing: GL-1 and GL-1/STC-45
a. Lamination for Blast Required: Use 7/16" on in board lites.
b. STC-45: Reference 1.4 Performance Requirements.

3. Interior Glazing: GL-3, GL-3/patterned, GL-3/laminated, and GL-3, wired.

END OF SECTION